

LISTING OF CLAIMS

The following listing of claims replaces all prior versions, and listings, of claims in the present application.

1. (Presently amended) Droplet deposition apparatus for depositing droplets on a substrate and comprising an elongate printhead, the substrate being movable relative to the printhead in a substrate movement direction and ~~the length of the printhead extending in a printhead direction orthogonal to the substrate movement direction~~ and having a length over which it extends in said printhead direction and a width over which it extends in said substrate movement direction, wherein the printhead comprises at least two print head units spaced in the printhead direction, each print head unit comprising at least two parallel rows of nozzles extending in the printhead direction with the rows being spaced apart in the substrate movement direction; an actuator for effecting the selective ejection of droplets from respective nozzles and a droplet fluid supply arrangement disposed such that a different fluid may be supplied to each row of nozzles, wherein said units are arranged such that a nozzle row of one unit combines with a nozzle row from a different unit to form an array wherein the nozzles within an array are supplied with the same ejection fluid and wherein the gap spacing between the end nozzle of one row in an array and the neighboring end nozzle of a different row in said array is greater than the inter-nozzle spacing within either of the rows and further wherein said length of said printhead is greater than said width of said printhead.

2. (Previously Presented) Apparatus according to Claim 1, wherein each printhead unit comprises at least three rows of nozzles, with each row of nozzles receiving from the supply arrangement a different color of ink.

App. No. 10/500,781
Amendment dated May 20, 2008
Reply to Office Action mailed December 20, 2007

3. (Previously Presented) Apparatus according to Claim 1, wherein each nozzle in one row of nozzles is aligned in position in the printhead direction with a nozzle in each of the other rows of nozzles.
4. (Previously Presented) Apparatus according to Claim 1, wherein each row of nozzles has the same length.
5. (Canceled)
6. (Previously Presented) Apparatus according to Claim 1, wherein the actuator for effecting the selective ejection of droplets from respective nozzles, comprises for each nozzle a pressure chamber in communication with the nozzle and in communication with the fluid supply arrangement.
7. (Canceled)
8. (Previously Presented) Apparatus according to Claim 6, wherein said pressure chambers comprise at least one wall of piezoelectric material.
9. (Canceled)
10. (Canceled)
11. (Previously Presented) Apparatus according to Claim 6, wherein the pressure chambers corresponding with one row of nozzles are provided in a row of pressure chambers on a base, with the pressure chambers corresponding with each other row of nozzles being provided in a respective other row of pressure chambers on the same base.

App. No. 10/500,781

Amendment dated May 20, 2008

Reply to Office Action mailed December 20, 2007

12. (Previously Presented) Apparatus according to Claim 11, wherein there are provided on the base, a divider to define around each row of chambers a fluid manifold region for use in the supply of fluid to the chambers of that row, the respective manifold regions being separate from each other.

13. (Original) Apparatus according to Claim 12, wherein ports are defined in the base for communication with each fluid manifold region.

14. (Original) Apparatus according to Claim 13, wherein at least two ports communicate with each manifold region to provide a flow through each chamber.

15. (Previously Presented) Apparatus according to Claim 11, wherein the base is planar and the divider comprises an apertured divider plate with said apertures defining the respective manifold regions.

16. (Canceled)

17. (Canceled)

18. (Canceled)

19. (Previously Presented) Apparatus according to Claim 1, wherein said array is linear.

20. (Canceled)

21. (Canceled)

App. No. 10/500,781
Amendment dated May 20, 2008
Reply to Office Action mailed December 20, 2007

22. (Previously Presented) Apparatus according to Claim 1, wherein said gap spacing equals the row length plus twice the inter-nozzle spacing.

23. (Previously Presented) Apparatus according to Claim 1 further comprising a transporter for supplying a printable substrate to a print zone disposed to receive droplets ejected from said nozzles.

24. (Previously Presented) Apparatus according to Claim 23, wherein a paper transporter supplies said printable substrate to said print zone in said substrate movement direction.

25. (Previously Presented) Apparatus according to Claim 23, wherein said paper transporter comprises a paper handling drum.

26. (Canceled)

27. (Canceled)

28. (Canceled)

29. (Canceled)

30. (Canceled)

31. (Canceled)

32. (Canceled)

App. No. 10/500,781
Amendment dated May 20, 2008
Reply to Office Action mailed December 20, 2007

33. (Canceled)

34. (Canceled)

35. (Canceled)

36. (Withdrawn) Droplet deposition apparatus for depositing droplets on a substrate and comprising an elongate printhead, the substrate being movable relative to the printhead in a substrate movement direction and the length of the printhead extending in a printhead direction orthogonal to the substrate movement direction, wherein the printhead comprises a plurality of like print head units spaced along the length of the printhead, each print head unit comprising at least two parallel rows of nozzles extending in the printhead direction with the rows being spaced apart in the substrate movement direction; an actuator for effecting the selective ejection of droplets from respective nozzles and a droplet fluid supply arrangement disposed such that a different fluid may be supplied to each row of nozzles and wherein the print head is movable relative to the substrate in the printhead direction to enable the nozzles of any row of nozzles to deposit droplets over a region of substrate broader than the length of the nozzle row.

37. (Canceled)

38. (Withdrawn) Apparatus according to Claim 36, wherein each printhead unit comprises at least three rows of nozzles, with each row of nozzles receiving from the supply arrangement a different color of ink.

39. (Canceled)

App. No. 10/500,781

Amendment dated May 20, 2008

Reply to Office Action mailed December 20, 2007

40. (Withdrawn) Apparatus according to Claim 36, wherein the actuator for effecting the selective ejection of droplets from respective nozzles, comprises for each nozzle a pressure chamber in communication with the nozzle and in communication with the fluid supply arrangement.
41. (Canceled)
42. (Withdrawn) Apparatus according to Claim 40, wherein said pressure chambers comprise at least one wall of piezoelectric material.
43. (Canceled)
44. (Canceled)
45. (Withdrawn) Apparatus according to Claim 36, wherein said units are arranged such that the nozzle row on one unit combines with a nozzle row from a different unit to form an array wherein the nozzles within an array are supplied with the same ejection fluid.
46. (Original) Apparatus according to Claim 45, wherein said array is linear.
47. (Original) Apparatus according to Claim 45, wherein said arrays are disposed such that nozzle spacing along array is non-uniform.
48. (Withdrawn) Apparatus according to Claim 45, wherein the gap spacing between the end nozzle of one row in an array and the neighboring end nozzle of a different row in said array is greater than the inter-nozzle spacing within either of the rows.

App. No. 10/500,781
Amendment dated May 20, 2008
Reply to Office Action mailed December 20, 2007

49. (Withdrawn) Apparatus according to Claim 48, wherein said inter-gap spacing equals the row length plus twice the inter-nozzle spacing.

50. (Withdrawn) Apparatus according to Claim 36, wherein the droplet fluid supply arrangement for each printhead comprises for each row of nozzles at least one fluid manifold.

51. (Withdrawn) Apparatus according to Claim 50, wherein said ink manifold supplies ejection fluid to a pressure chamber associated with each nozzle, for flow of the ejection fluid through said pressure chamber to a further ink manifold associated with each row of nozzles.

52. (Canceled)

53. (Withdrawn) Apparatus according to Claim 50, wherein a port is provided that extends between an ink manifold and an ink supply chamber.

54. (Withdrawn) Apparatus according to Claim 53, wherein said ink supply chamber is located within an ink supply unit.

55. (Previously presented) Apparatus according to Claim 1, wherein said head units are mounted to an ink supply unit.

56. (Canceled)

57. (Withdrawn) Apparatus according to Claim 54, wherein said ink supply unit comprises a plurality of ink supply cavities at least one ink supply cavity communicating with a respective row of nozzles.

App. No. 10/500,781
Amendment dated May 20, 2008
Reply to Office Action mailed December 20, 2007

58. (Withdrawn) Apparatus according to Claim 57, wherein a supply cavity is provided for each type of ejection fluid.

59. (Withdrawn) Apparatus according to Claim 58, wherein said supply cavity is divided into an inlet supply cavity and an outlet supply cavity.

60. (Currently Amended) Apparatus according to Claim ~~[[47]]~~ 55, wherein said ink supply unit comprises a plurality of supply cavities each communicating with a respective array.

61. (Withdrawn) A method of supplying ink to a print head unit comprising the steps: providing a print head unit comprising at least two rows of nozzles extending along a print head substrate the length of each row lying in a print head direction, said rows lying parallel with the other rows in a direction orthogonal to said row length and wherein each row comprises an associated row of pressure chambers, providing an ink supply unit comprising supply manifolds and removal manifolds, disposing said ink supply unit and said print head unit in such a relation that each of said rows of pressure chambers communicates with a supply manifold and a removal manifold, said supply manifold and said removal manifold being adjacent, causing ejection fluid to flow from a supply manifold to a removal manifold through a pressure chamber in a flow direction; and wherein said flow direction for adjacent rows of pressure chambers are opposite.

62. (Withdrawn) A method according to Claim 61, wherein said print head unit comprises at least three rows of nozzles.

63. (Withdrawn) A method of printing a multicolor image on a substrate comprising the steps: providing a printing apparatus comprising an elongate printhead, the substrate being movable relative to the printhead in a substrate movement direction and the length of the printhead extending in a printhead

App. No. 10/500,781
Amendment dated May 20, 2008
Reply to Office Action mailed December 20, 2007

direction orthogonal to the substrate movement direction, wherein the printhead comprises at least one print head unit, the or each print head unit comprising at least two parallel rows of nozzles extending in the printhead direction with the rows being spaced apart in the substrate movement direction; an actuator for effecting the selective ejection of droplets from respective nozzles and a droplet fluid supply arrangement disposed such that a different fluid may be supplied to each row of nozzles; supplying different color ink to said rows of pressure chambers, ejecting a multi-color swath from said print head unit, indexing said print head unit in said print head direction, and ejecting a further multi-color swath from said print head unit.

64. (Withdrawn) A method of printing a multicolor image on a substrate comprising the steps: providing a printing apparatus comprising an elongate printhead, the substrate being movable relative to the printhead in a substrate movement direction and the length of the printhead extending in a printhead direction orthogonal to the substrate movement direction, wherein the printhead comprises at least two print head units spaced in the printhead direction, each print head unit comprising at least two parallel rows of nozzles extending in the printhead direction with the rows being spaced apart in the substrate movement direction; an actuator for effecting the selective ejection of droplets from respective nozzles and a droplet fluid supply arrangement disposed such that a different fluid may be supplied to each row of nozzles; supplying different color ink to said rows of pressure chambers, ejecting a multi-color swath from said print head unit, indexing said print head unit in said print head, and ejecting a further multi-color swath from said print head unit.

65. (Withdrawn) A method according to Claim 64, wherein a complete image is printed with one said indexing step.

App. No. 10/500,781

Amendment dated May 20, 2008

Reply to Office Action mailed December 20, 2007

66. (Withdrawn) A method according to Claim 64, wherein said indexing step comprises indexing said print head n times a distance which is equal to $1/n$ times the sum of the nozzle row length plus the nozzle spacing.

67. (Withdrawn) Apparatus according to Claim 1, wherein each printhead unit comprises four rows of nozzles, with each row of nozzles receiving from the supply arrangement a different color of ink.

68. (Withdrawn) Apparatus according to Claim 36, wherein each printhead unit comprises four rows of nozzles, with each row of nozzles receiving from the supply arrangement a different color of ink.

69. (New) Droplet deposition apparatus for depositing droplets on a substrate and comprising an elongate printhead, the substrate being movable relative to the printhead in a substrate movement direction and the length of the printhead extending in a printhead direction orthogonal to the substrate movement direction, wherein the printhead comprises at least two print head units spaced in the printhead direction, each print head unit comprising at least two parallel rows of nozzles extending in the printhead direction with the rows being spaced apart in the substrate movement direction; an actuator for effecting the selective ejection of droplets from respective nozzles so as to form a swathe of deposited droplets extending in said substrate movement direction on said substrate and a droplet fluid supply arrangement disposed such that a different fluid may be supplied to each row of nozzles, wherein said units are arranged such that a nozzle row of one unit combines with a nozzle row from a different unit to form an array wherein the nozzles within an array are supplied with the same ejection fluid and wherein the gap spacing between the end nozzle of one row in an array and the neighboring end nozzle of a different row in said array is greater than the inter-nozzle spacing within either of the rows and further wherein there is a gap in said printhead direction between swathes deposited by adjacent print head units.

App. No. 10/500,781

Amendment dated May 20, 2008

Reply to Office Action mailed December 20, 2007

70. (New) Droplet deposition apparatus for depositing droplets on a substrate and comprising an elongate printhead, the substrate being movable relative to the printhead in a substrate movement direction and the length of the printhead extending in a printhead direction orthogonal to the substrate movement direction, wherein the printhead comprises at least two print head units spaced in the printhead direction, each print head unit comprising at least two parallel rows of nozzles extending in the printhead direction with the rows being spaced apart in the substrate movement direction; an actuator for effecting the selective ejection of droplets from respective nozzles and a droplet fluid supply arrangement disposed such that a different fluid may be supplied to each row of nozzles, wherein said units are arranged such that a nozzle row of one unit combines with a nozzle row from a different unit to form an array wherein the nozzles within an array are supplied with the same ejection fluid and wherein the gap spacing between the end nozzle of one row in an array and the neighboring end nozzle of a different row in said array is greater than the inter-nozzle spacing within either of the rows and further wherein the nozzles in an array are disposed on a single line parallel to said printhead direction.